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Success Story

COST-EFFECTIVE AIR SPARGED HYDROCYCLONE TECHNOLOGY PROVIDES TREATMENT FOR PROBLEMATIC WASTE STREAMS



Air-sparged hydrocyclone (ASH) technology will provide the Air Force with significant cost savings compared to current practices associated with treatment of waste streams generated by a variety of Department of Defense (DoD) activities. The ASH system works well with streams containing oil and grease, aqueous film forming foam (AFFF), and in streams containing a combination of these contaminants.

The cost of operating ASH technology, including the cost of consumables and utilities associated with the system, ranges from \$.17 per 1,000 gallons treated for AFFF treatment with no chemical treatment to \$2.54 per 1,000 gallons treated for extremely high oil and grease concentrations with chemical pre-treatment.



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Accomplishment

Scientists at the Materials and Manufacturing Directorate, under a collaborative effort with the Naval Facilities Engineering Service Center and the contractor, Kemco Systems, Inc., developed a cost-effective ASH technology to treat waste streams containing emulsified petroleum-based substances such as fuels, oils, and greases. This time-saving technology can also treat fire-fighting chemicals, such as AFFF, used to suppress combustible and flammable liquid fuel fires.

Background

Anxious to test the ASH technology, researchers developed a field test/demonstration project to validate the effectiveness of the ASH system at removing emulsified fuels, oil, grease, and AFFF from waste streams generated at nine DoD sites. The objective of the project was to demonstrate the commercial viability of the system and allow an audience to witness the operation of the technology, opening doors for transfer of the technology to other DoD agencies and industry.

The ASH system works by combining flotation principles with the separation characteristics of a hydrocyclone, which separates fuel, oil, and grease from water. In the case of fine particles and oil removal, the ASH system improves the ability of fine particles and oil droplets to float.

The ASH system effectively and efficiently removed emulsified oil, grease, and AFFF from waste streams with an average removal rate of greater than 87% for oil and grease removal and greater than 90% for AFFF removal. The researchers also achieved these results in cases of high AFFF concentration (over 500 parts per million).

The concentrated sludge remaining from ASH processing is less than 10% of the original stream volume and, in many cases, lower than 7%. Researchers conducted toxicity-leaching tests on this sludge and classified the sludge as non-hazardous.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (02-ML-07)